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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Takuya Tsukagoshi

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EXAMINER

CHANG, AUDREY Y

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/589,362	<b>Applicant(s)</b> TSUKAGOSHI ET AL.	
	<b>Examiner</b> Audrey Y. Chang	<b>Art Unit</b> 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10, 13-20, 22 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20, 22 and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Remark*

- This Office Action is in response to applicant's amendment filed on August 29, 2008, which has been entered into the file.
- By this amendment, the applicant has amended claims 1-10, 13-20 and 22-23.
- Claims 1-10, 13-20 and 22-23 remain pending in this application.

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 1-10, 13-20 and 22-23 are rejected under 35 U.S.C. 112, second paragraph**, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims include the following phrases that do not appear to have logical and structural relationships among them which therefore make the scopes of the claims unclear. The confusing phrases are: “data image *to be retrieved*”, “digital information”, “data page”, “bit map image”, “data image address”, “block information”, “retrieval data block”, “address”, “target data image”, and “encoded data image”, “to-be-retrieved digital information” (amended claim 15). Clarifications in the claims are required to make each phrases and terms logically and structurally related to each other. **The applicant is respectfully noted that there is only one data information that being recorded and being retrieved. It really does not need to use so many different phrases to describe the same thing to make the claims so confusing.**

**It is not clear what is considered to the "data image to be retrieved" in the amended claims.**

It is noted the process described in the claims WILL NOT be able to retrieve any "data" that is recorded as hologram in the medium. So the "data image to be retrieved" is not corrected.

It is not clear what is being multiplexedly recorded? **The applicant is respectfully noted** that a (single) data page (as amended) is NOT being multiplexed recorded. Perhaps **a plurality of data pages** are being "multiplexed recorded".

The applicant is respectfully noted that, the term "data page" usually used in the art for the data information displayed on the spatial light modulator to modulate the signal beam and to record the data information in the hologram. In light of the specification of instant application it appears, the holographic recording and retrieving system has (1) *data* information (such as data page), to modulate the signal beam to record the hologram, and (2) *address* information or data that can be encoded in the data page, also is recorded in the hologram. The recorded hologram can be reconstructed using signal beam with coded *address* information to reconstruct or *retrieve* **address information**. The recorded hologram can also be *reconstructed* using *reference* beam to reconstruct the **data page information**. The terminologies and the phrases should be clearly stated so that the proper channel of the retrieving or reconstruction is identified and corresponding information is retrieved or detected. In light of this, the method and apparatus of the claims cannot retrieve data image, referring to the data pages, by using the signal beam having the "data image to be retrieved". The claims 1-11 and 14 are really referring to a searching process for searching the intended data image. However no such image data can be retrieved by this process.

It appears that there is retrieve process for retrieving address information and there is reconstruction process for reconstruct the recorded data page as hologram. The two processes should be clearly identified and **distinct** to avoid confusions. **Claims 15 and 23 have been amended** to include part of process for determining address and part of the process for retrieving the recorded data, however

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there is no logical connection between the two to make the scopes of the claims very unclear and confusing.

The claims fail to disclose what does it mean by "**encoding method**"? The encoding method is to encode what? The data information or the address information or both?

The applicant is also respectfully noted that a data page does not have "ON" or "OFF" pixels by itself since data page should be just abstract numbers. It is only when the data being **digital** data is represent and displayed on the spatial light modulator, that the spatial light modulator correspondingly has ON or OFF (or bight or dark) pixels. The pixels are in the spatial light modulator not in the data itself.

**Claim 15 has been amended** to include the phrase "holographic recording medium having a hologram recording medium". It is confusing and wrong since if there is only a single hologram recorded in the recording medium then what is point of having all the process to determine the address since the single hologram can be easily retrieved.

It is also not clear how could the "data image address" can be determined by the diffracted beam. It is not clear if the data image address needed to be **first** recorded within the hologram?

The amended phrase "data pages" recited in the amended claims is confusing since it lacks proper antecedent basis.

The **scopes** of the claims **are really unclear** for the reasons stated above.

The claims at this juncture contain numerous errors, confusions and indefiniteness. The claims also are very narrative. The examiner can only point out a few it is applicant's responsibility to clarify ALL discrepancies and errors to make the claims in comply with requirements of 35 USC 112.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**4. Claims 1-10, 13-20 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Henshaw et al (PN. 5,319,629) in view of the article "Content-addressable data storage by use of volume holograms" by Burr et al (Applied Optics Vol. 38, No. 32, November 1999, pages 6779 6784).**

**Claims 1-10, 13-20 and 22-23 have been significantly amended that necessitate the new grounds of rejections.**

*The scopes of the claims are very unclear for the reasons stated in the rejection under 35 USC 112, second paragraph above. The claims can only be examined in the broadest interpretation.*

The claims are being examined in the following interpretations: "data page" is interpreted as the data information displayed on the spatial light modulator for modulating the signal beam for *recording* the hologram. "Data image to be retrieved" and "data image address" is interpreted as "address information" for the data page. The "encoding method" is interpreted as encoding method for encoding the address information in the data page.

**For claims 1, 9, 15 and 23:**

**Henshaw et al** teaches a *content addressable optical data storage system* in a holographic recording and retrieving system wherein the recording and retrieving system is comprised of a *laser light source* (102, Figure 2) for generating a coherent light beam (103) that is to be splitted by a *beam splitter* (104) into a *reference beam* (106) and a *data* or an *object beam* (108), coherent to each other. The holographic recording and retrieving system further comprises an *object optical system* (elements 122, 126, 128) and a *reference optical system* (elements 111, 112, 114, and 116) to direct the object beam and the reference beam respectfully to a *holographic recording medium* (118), wherein the object optical

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system includes a *spatial light modulator* (126) wherein the page data intended to be recorded as the hologram is being displayed on the spatial light modulator. The data page is being represent by the spatial light modulator as a *two-dimensional array of bright (ON) and dark (OFF) pixels* which forms a *bit map image*, and this means the data in the data pages is essentially digital data, (please see column 6, lines 36-39). Henshaw et al teaches that the plurality of data pages are recorded in the holographic recording medium with different wavelengths and Bragg angles, which means the data pages are recorded in *multiplexing scheme*, (i.e. wavelength and angle multiplexing methods, please see column 6, line 65 to column 7, line 2).

The holographic recording and retrieving system further comprises a *retrieving imaging device* or address output plane (144, Figure 1) for receiving diffracted light beams from the holographic recording medium when the medium is being illuminated by a *signal beam or searching beam* travels along the object optical system, (please see column 7, lines 40-46 and column 8, lines 4-15). Henshaw et al teaches that the address output plane or the retrieving imaging device is to receive and detect the *address information* it is therefore either implicitly or obvious to one skilled in the art to include a signal processing circuit for processing the received output signal at the address output plane (144) to detect the address information.

**Claims 1, and 9 have been amended** to include the phrase of “receiving one or more diffracted beam emitted from the holographic recording medium” and **claims 1, 9, 15 and 23 have been amended** to include the phrase “detecting a target diffracted beam having a maximum intensity of the one or more diffracted beams” or “the diffracted beam having a maximum intensity of the one or more diffracted beams”. Henshaw et al teaches that the holograms are recoded in multiplexing manner this means that one or more diffracted beams (or reference beams for multiplexing recording the holograms) can be reproduced from the illumination of the object beam to the hologram recording medium. This reference teaches that the address information can be retrieved. However this reference does not teach explicitly

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that the diffracted beam with maximum intensity is detected as the targeted diffracted beam. **Burr et al** in the same field of endeavor teaches a content-addressable data holographic storage wherein the targeted diffracted beam (or the targeted reference beam) is determined by finding correlation peak of the plurality of diffracted or reference beams with the input data page, (the correlation peak is corresponding to the maximum intensity of the diffracted beam with the input data page), (please see page 6780 column 1, paragraph 2). It would then have been obvious to one skilled in the art to modify the content addressable optical data storage system in a holographic recording and retrieving system of Henshaw et al to use such correlation peak as means to determine the targeted reference beam so that the desired data page can be eventually retrieved.

**Claims 1, 9, 15 and 23, have also been amended** to include the phrase “retrieval data page containing a data image to be retrieved”. Henshaw et al teaches that retrieval data page includes a data array containing search argument (please see column 8, lines 10-12). Burr et al teaches that the retrieval data page including database search data that based on the database intended to be searched, (please see page 6780, column 2). This means the retrieval data page includes search data that is based on the data page intended to be searched and retrieved eventually. Even though these references do not teach that the retrieval data page contains exactly the same data to be retrieved, this feature is either included in the disclosures or an obvious modification to one skilled in the art. Since based on the fundamental theory of the hologram, the object beam used to record the hologram can be used to retrieve the reference beam used to record the hologram when the object beam is illuminated the holographic recording medium, (please see page 6779, column 1 paragraph 3 of Burr et al). It would then have been obvious to one skilled in the art to modify the recording and retrieving system of Henshaw et al to use the original signal or object beam to retrieve the targeted reference beam that can eventually be used to retrieve the recorded object information.

**Claims 15 and 23 have been amended** to include the feature that the retrieval data page has a plurality of data blocks. Henshaw et al teaches that the retrieval data page could include a plurality of data blocks, (please see Figures 4F and 4G).

The holographic recording and retrieving system also comprises a *reproduction imaging device* or output data plane (134, Figure 1) for receiving the reproduced holographic image contains the recorded data page when the recording medium is being illuminated by the reference serves as the reconstruction or read beam based on the address information detected in the image retrieving device, so that the data reproduction is address based, (please see column 7, lines 3-27).

Henshaw et al teaches that the data page is displayed on the spatial light modulator (126) in a bit map format with patterns of ON (bright) and OFF (dark) pixels. Henshaw also teaches that the address information is encoded on the *spatial light modulator* (126) as target data field or search arguments. The encoded address information on the spatial light modulator is essentially represent by plurality of ON (bright) and OFF (dark) pixels, (please see Figures 2-4, column 3, lines 3-30). The encoded address information is displayed on the spatial light modulator (126) that modulates the signal beam propagates in the object optical system to illuminates the holographic recording medium (118) which reproduces address information in the diffracted beams. It is implicitly true the diffracted light beam with maximum intensity (i.e. major diffraction order) that yields the address information.

The retrieved address information then is fed to the select the reference beam corresponding to the address information for reproducing the selected or target data information recorded in the holographic recording medium.

The reference has therefore met all the limitations of the claims. This reference teaches that the data page has the format as shown in Figure 2 and the data page with the encoded address information is shown in Figure 3A. It however does not teach explicitly that the data page is being equally divided into data blocks with the address information being identified as block information. But the data page can be

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arbitrarily divided up into either one block or a plurality blocks. Henshaw et al demonstrates to encode the address information for one data block and the same process can be repeatedly applied to other blocks if there are more than one blocks of data in the data page, for the benefit of allowing the data page be handled block by block to reduce the amount of the data being process at one time.

With regard to claims 2 and 16, the scopes of the claims are not clear the claim can only be examined in the broadest interpretation. It is implicitly true that when retrieving the address information, the pixels on the spatial light modulator that are irrelevant to the address information should remain OFF.

With regard to claims 3-4 and 17-18, the scopes of the claims are not clear the claims can only be examined in the broadest interpretation. It is implicitly true that for the intended data to be reproduced, (which corresponds to the dedicated data block), the address information encoded in the data block should contain more ON pixels than the address information would be encoded in other block that is not intended for the reproduction so that only the desired data block is searched.

With regard to claims 5 and 19, the beam diameter of the signal beam that is modulated by the encoded address information is certainly determined by the encoded address information on the spatial light modulator.

With regard to claims 6-7, it would have been obvious to one skilled in the art to make the address information for different data recorded to be displayed sequentially on the spatial light modulator so that only one of address information is retrieved and only the corresponding data is reproduced based on the retrieve address information at a time.

With regard to claims 8 and 22, it is implicitly true that the address information can be displayed for all the data blocks so that multiple diffraction beams can be resulted. It is implicitly true the diffraction light with the maximum intensity which corresponds to the major diffraction order is used to retrieve the address information for best signal for reveal such information.

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With regard to claims 10, 13 and 14, Henshaw et al teaches that the reproduction of the holographic data is address based which means the reproducing reference beam is generated based on the retrieved address information, (please see column 7, lines 3-27).

### ***Response to Arguments***

5. Applicant's arguments filed on August 29, 2008 have been fully considered but they are not persuasive. The amended claims have been fully considered and are rejected for the reasons stated above.

6. In response to applicant's arguments which state that the cited Henshaw reference does not teach explicitly that the retrieval data page containing a data image to be retrieved, which therefore patentably differs from the instant application, the examiner respectfully disagrees for the reasons stated below. Firstly it is not clear what is the "retrieval data page containing a data image to be retrieved"? Since by the process recited in the claims, the data image to be retrieved is the reference beams. It is not clear then if the reference beams are the "image data to be retrieved"? Furthermore, if this phrase means that the original object or data page is used as the retrieval data page then this is really not an invention but using the fundamental theory of hologram is retrieve the reference beam used to record hologram. Since according to the fundamental theory of hologram, the signal beam used to record the hologram is used as the retrieval beam for retrieving reference beam used to record the hologram and the reference beam used to record the hologram is used as the retrieval beam to retrieve the signal beam used to record the hologram. So use the original data beam to retrieve the reference beam is nothing new.

### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing

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date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (9:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephone B. Allen can be reached on 571-272-2434. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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